

POLYCARPAEA (CARYOPHYLLACEAE) IN AUSTRALIA

By L. PEDLEY

Queensland Herbarium, Brisbane

SUMMARY

Diagnoses and a key to the twelve species occurring in Australia are given. Taxa described for the first time are:—*P. arida*, *P. fallax*, *P. microphylla*, *P. corymbosa* var. *minor*, *P. corymbosa* var. *torrensis* and *P. spirostylis* subsp. *compacta*. New combinations are: *P. breviflora* var. *gracilis* (based on *P. synandra* var. *gracilis* Benth.), *P. spirostylis* subsp. *densiflora* and subsp. *glabra* (based on *P. synandra* var. *densiflora* Benth. and *P. glabra* White & Francis respectively). Other names placed in synonymy are: *P. brevianthera* Ewart & Cookson, *P. burtonii* F. M. Bailey, *P. gamopetala* Berhaut, *P. longiflora* var. *leucantha* Benth., *P. parviflora* Domin, *P. pumilio* Domin, *P. spirostylis* var. *intercedens* Domin var. *intricata* Domin, and var. *resulans* Domin, *P. synandra* F. Muell., *P. triloba* Ewart & Cookson and *Reesia erecta* Ewart. The name *P. breviflora* F. Muell. has been misapplied to the taxon described as *P. corymbosa* var. *minor*. The record of *P. spicata* Arn. from Australia is considered doubtful.

Some species of *Polycarpaea* are of interest to geobotanists (White & Francis 1926, Cole 1965) and in recent years there has been a demand for the correct identification of Australian material of the genus. Bakker (1957) provided an account of Malesian species, but there has been no treatment of the genus in Australia since Bentham (1863).

The taxonomy and nomenclature of Australian species proved to be somewhat confused. These notes fall short of a full revision, mainly because of the brief descriptions which lack detail about the ovary, capsule and seeds.

Key to taxa

1. Corolla lobes free or united into tube less than 0.5 mm long; staminodes* sometimes present, sepals less than 5 mm long, sometimes without distinct midribs 2
Corolla lobes united into a tube more than 0.5 mm long; staminodes absent; sepals up to 13 mm long with distinct midribs 13
2. Leaves less than 2 mm long, as long as the internodes 2 *P. microphylla*
Leaves more than 4 mm long, usually shorter than internodes 3
3. Staminodes present as linear projections inside petals; sepals 4-5 mm long with definite midribs 4
Staminodes absent; sepals often without definite midribs 6
4. Stems glabrous; sepals tinged with red, glabrous; capsule *ca* $\frac{1}{3}$ as long as corolla 1 *P. violacea*
Stems sparsely pubescent; sepals white; capsule at least $\frac{1}{2}$ as long as corolla 5

* See Bakker for discussion on morphology of staminodes

5. Sepals *ca* 4 mm long, hirsute towards base 2 *P. staminodina*
 Sepals 4.5–5.5 mm long, not hirsute, slightly fimbriate 3 *P. fallax*
6. Several stems from a rosette of broad obovate or oblong radical leaves or simple stem
 with a pair of basal \pm orbicular leaves 7
 Stems simple, or if much branched then without rosette of broad leaves 9
7. Single stem with pair of broad basal leaves; corolla 1.3 mm long with a distinct fold
 inside at base 6 *P. diversifolia*
 Much branched with basal rosette; corolla *ca* 3.5 mm long, corolla without fold 8
8. Plant pubescent; heads sessile, surrounded by herbaceous floral leaves; sepals without
 midribs 7 *P. involucrata*
 Plant glabrous; heads pedunculate with scarious bracts; sepals with midribs **P. spicata*
9. Capsule 1-seeded; much branched herbs; leaves with fine setaceous points *ca* 0.5 mm
 long 8 *P. holtzei*
 Capsule with at least 5 seeds; sparingly branched; leaves usually with shorter points 10
10. Inflorescence subtended by floral leaves longer than the inflorescence 5 *P. arida*
 Inflorescence not subtended by floral leaves 4 *P. corymbosa*. 11
11. Sepals with \pm distinct midribs; capsule 1.4–2 mm long; leaves as long as or longer
 than the internodes 4b. *P. corymbosa* var. *torrensis*
 Sepals without midribs; capsule to 1.6 mm long; leaves shorter than internodes 12
12. Sepals often reddish at base to *ca* 2.5 mm long; petals 0.7–1.1 mm long
4b *P. corymbosa* var. *minor*
 Sepals white; 2.5–3.5 mm long; petals 0.6–1.4 mm long 4a *P. corymbosa* var. *corymbosa*
13. Stems pubescent; calyx white or suffused with pink, 5–9 mm long; corolla 2.8–7.5 mm
 long 10 *P. longiflora*
 Stems glabrous; calyx with pink or purplish midrib, not white or suffused with pink 14
14. Sepals less than 4 mm long and corolla less than 2.6 mm long 12 *P. breviflora* 15
 Sepals more than 4.5 mm long and corolla more than 3.4 mm long 11 *P. spirostylis* 16
15. Sepals ovate, white (midrib not coloured), inflorescence rather open
12a *P. breviflora* var. *breviflora*
 Sepals narrowly ovate, white with distinct purplish midrib, inflorescence rather compact
12b *P. breviflora* var. *gracilis*
16. Inflorescence open, pedicels more than 0.8 mm long; sepals 6–13 mm long 17
 Inflorescence compact, pedicels less than 0.8 mm long; sepals 4.5–7 mm long 18
17. Sepals 7–13 mm long with purplish midribs; petals only shortly bifid; staminal filaments
 shorter than the corolla 11a *P. spirostylis* subsp. *spirostylis*
 Sepals 6–7 mm long with red-brown midribs; petals deeply bifid (1 mm or more);
 staminal filaments longer than the corolla 11b *P. spirostylis* subsp. *glabra*
18. Sepals 6–7 mm long with purplish midribs, acute 11c *P. spirostylis* subsp. *densiflora*
 Sepals 4.5–5 mm long with red-brown midribs, not noticeably acute
11d *P. spirostylis* subsp. *compacta*

* See p. 61

1. **Polycarpaea violacea** (Mart.) Benth., Fl. Aust. 1:165 (1863). Based on *Aylmeria violacea* Mart., Nov. Acta Physcio-Med. Nat. Cur. 13:277 (1826). **Type:** Crokers I., April $\frac{267}{1818}$, *Cunningham* (BRI, K, MEL, iso?—see below).

Achyranthes violacea (Mart.) Spreng., Syst. Cur. Post. 102 (1827).
Based on *Alymeria violacea*.

Alymeria rosea Mart., Nov. Acta Physcio-Med. Nat. Cur. 13:277 (1826).
Type: *Ex herb. Lambert* (K, iso).

Achyranthes rosea (Mart.) Spreng., Syst. Cur. Post. 103 (1827). Based on *Alymeria rosea*.

Stems glabrous erect with rather short internodes. Leaves glabrous, rather broad. Bracts white without prominent midribs, 2-3 mm long; pedicels *ca* 2 mm long, pubescent. Sepals 5 mm long tinged with red, with prominent midrib rather broad in basal 2 mm; petals obtuse or obtusely bifid, up to 2 mm long; anthers shorter than corolla; staminodes not prominent. Capsule *ca* $\frac{1}{3}$ as long as corolla.

Range: Extreme northern part of the Northern Territory.

Northern Territory: Crokers I., Apr $\frac{267}{1818}$, *Cunningham* (BRI, K, MEL); near Darwin, Mar 1914, *Allen* 122 (K); 14 miles [22 km] E of Darwin, Mar 1964, *Adams* 909 (CANB, K); Humphy Doo, Mar 1961, *McKee* 8315 (K); Delissaville, Cox's Pen., Mar 1948, *Specht* 78.

Two sheets are segregated at K as types. One is *Cunningham* 267. On the other, one fragment labelled *Alymeria violacea* Mart. which was sent by Martius is probably also part of the *Cunningham* collection. The other fragment on the same sheet is merely labelled *Aylmeria rosea* Mart. "ex herb Lambert". This may be an isotype of *A. rosea*.

2. **Polycarpaea staminodina** F. Muell., Rep. Babbage Exp. 8 (1858). **Type:** Head of Sturt Creek, Feb 1856, *Mueller* (MEL, holo).

Sparingly pubescent erect herb. Leaves recurved, pubescent. Bracts at base 2.5-3.5 mm long, often bilobed at apex; pedicel pubescent. Sepals usually hirsute at base, with a definite midrib, *ca* 4 mm long; petals *ca* 1.2 mm long, shortly bilobed; staminodes linear $\frac{1}{4}$ - $\frac{1}{3}$ as long as petals. Capsule about half as long as petals.

Range: North-western part of the Northern Territory.

Northern Territory: Victoria River, Apr 1856, *Mueller* (K); Cullen & Ferguson River, in 1927, *Allen* (K); 12 miles [20 km] SW of Katherine, Jun 1949, *Perry* 1975 (BRI, CANB, K, MEL).

3. **Polycarpaea fallax** Pedley, sp. nov. affinis *P. staminodinae* F. Muell. sepalis glabris brevioribus et petalis longioribus differt. **Typus:** *Specht* 708 (Holotypus: BRI; isotypus: K, MEL).

Herb erecta ad 0.5 m alta caulibus sparsim pubescentibus. Folia 1-2 cm longa concava; stipulae subulatae ca 4 mm longae. Inflorescentiae terminales \pm compactae; bracteae ca 5 mm longae, anguste ovatae, bifidae laciniataeve apice, fimbriatae basi; pedicelli pubescentes. Sepala 4.8-5.5 mm longa costis \pm prominentibus lanceolata ovatae leviter fimbriata prope basin; petala 1.8-2 mm longa ca 0.4 mm lata leviter erosa vel obtusa apice. Stamina: filamenta ca 1.6 mm longa; antherae oblongae vel sagittatae 0.4 mm longae. Capsula globosa ca 1.8 mm longa.

Erect herb to 50 cm high with sparsely pubescent stems. Leaves 1–2 cm long, concave; stipules subulate, *ca* 4 mm long. Inflorescences terminal \pm compact; bracts *ca* 5 mm long, ovate lanceolate, bifid or laciniate at the apex, fimbriate at the base; pedicels pubescent. Sepals 4.8–5.5 mm long with \pm prominent midribs, lanceolate or ovate slightly fimbriate near the base; petals 1.8–2 mm long, *ca* 0.4 mm wide, slightly erose or obtuse at the top. Stamens: filaments *ca* 1.6 mm long; anthers oblong or sagittate, 0.4 mm long. Capsule globose, *ca* 1.8 mm long.

Range: Northern part of the Northern Territory and the lower part of the Ord River basin in Western Australia.

Western Australia: 27 miles [43 km] NNE of "Denham River", Jul 1949, *Perry* 2537 (BRI, CANB, MEL); near Kununurra, 15° 45'S, 128° 44'E., Sep 1970, *Scarth-Johnson* 559 (BRI, K). **Northern Territory:** Port Darwin, in 1884, *Holtze* 417, and Jul 1886, *Tenison-Wood* (MEL); Port Bradshaw, Jul 1948, *Specht* 708 (BRI, MEL); Yirrakala, Jul 1948, *Specht* 681 (BRI, MEL); Arnhem Land, *Brown* (MEL) and Apr-Jun 1928, *Basedow* (K).

P. fallax has been confused with *P. longiflora* (Section *Planchonia*) but the presence of staminodes points to a relationship with *P. staminodina* in section *Aylmeria*.

4. *Polycarpacea corymbosa* (L.) Lam., Tab. Encycl. Meth. Bot. 2:129 (1797).

Based on *Achyranthes corymbosa* L., Sp. Pl. 1:205 (1753). **Type:** not seen.

Pubescent, sometimes glabrescent; leaves \pm glabrous up to 2.5 cm long. Bracts often fimbriate, usually 2-lobed, 2–4.5 mm long; peduncles hirsute. Sepals with or without distinct midribs, white or slightly thickened and reddish at the base, 1.8–3.7 mm long; petals \pm acute, obtuse or slightly erose, 0.6–1.4 mm long, $\frac{1}{3}$ – $\frac{1}{2}$ as long as the sepals; anthers usually shorter than the petals. Capsule 1–2 mm long.

4a. *P. corymbosa* var. *corymbosa*

Sepals 1.9–3.7 mm long; petals 0.6–1.4 mm long; capsules 1–1.6 mm long. Leaves not as long as internodes; calyx without reddish tinge towards the base.

Range: Coastal and subcoastal districts of Australia north of about 22°S lat. in both Western Australia and Queensland.

Western Australia: Between Ashburton and Yule Rivers, *Clement* (K); between De Grey R. and Lagrange B., in 1879, *Forrest and Carey* (MEL); Derby, Apr 1927, *Ewart* (MEL); near the Ord River, in 1886, *O'Donnell* (MEL). **Northern Territory:** Victoria River, Feb 1856, *Mueller* (MEL); 12 miles [20 km] SW of Hooker Creek, Apr 1959, *Chippendale* NT 2230 (MEL); Katherine, Apr 1964, *Adams* 952 (MEL); Newcastle Waters, in 1887, *Giles* (MEL); Arnhem Land, Apr-June 1928, *Basedow* 17 (K). **Queensland:** BURKE DISTRICT: Adels Grove, Jun 1950, *de Lestang* 476 (BRI); Sweets I., Jun 1901, *J. F. Bailey* (BRI); Einasleigh River, *Armit* 547 (MEL); "Chudleigh Park", 110 miles [174 km] N of Hughenden, Feb 1931, *Hubbard & Winders* 7609 (BRI, K). COOK DISTRICT: 2.5 miles [4 km] S of Somerset, May 1948, *Brass* 18696 and 19481 (BRI, K); 8 miles [13 km] W of Musgrave T.O., 13°48'S 143°22'E, Jun 1968, *Pedley* 2657 (BRI); near Tolga, Apr 1962, *McKee* 9406 (BRI, K); Lizard I., Aug 1848, *Macgillivray* 392 (K). NORTH KENNEDY DISTRICT: Cleveland Bay, in 1896, *Mattingley* (MEL); Don River, Edgecombe Bay, in 1886, *Blrch* (MEL). SOUTH KENNEDY DISTRICT: Upper Belyando, in 1883, *Emmerson* (MEL). PORT CURTIS DISTRICT: Rosedale, May 1930, *Dovey* D75 (BRI).

4b. *P. corymbosa* var. *minor* Pedley, var. nov. a *P. corymbosa* var. *corymbosa* floribus parvis (sepala 1.8–2.2 mm longa; petala 0.7–1.1 mm longa at capsula 0.1–1.1 mm longa) et sepalis area incrassata triangulare rubra saepe basi instructis dignoscenda. **Typus:** *Pedley* 1234 (BRI, holo; K, MEL, iso).

Misapplied name: *P. breviflora* auct. non F. Muell: Benth., Fl. Aust. 1:166 (1863).

Distinguished from *P. corymbosa* var. *corymbosa* by the smaller flowers. (Sepals 1.8–2.2 mm long; petals 0.7–1.1 mm and capsule 0.8–1.6 mm long) and the sepals often with a reddish triangular thickened area at the base.

Range: Coastal and semi-arid areas of north-eastern Northern Territory, Queensland and north-eastern New South Wales. One specimen from New Guinea.

Northern Territory: Bulman, 13° 38'S 134° 25'E, Apr 1963, *Cole* Bulman 10 (K); "Beswick" [14° 30'S 133°E], Apr 1962, *Nelson* 261 (MEL). **Queensland:** BURKE DISTRICT: N of "Riversleigh", Jun 1963, *Gittins* 807 (BRI). COOK DISTRICT: Gilbert River, *Bick* (BRI); Palmer River, in 1895, *Field* (MEL); Yorkey's Knob beach near Cairns, May 1962, *McKee* 9477 (BRI). NORTH KENNEDY DISTRICT: "Cashmere", Mar 1875, *Armit* 154 (MEL); Herbert River, Rockingham Bay, Sep 1869, *Dallachy* (MEL); Edgecumbe Bay, *Michael* 1185 (BRI). MITCHELL DISTRICT: Jericho, Mar 1946, *Clemens* (BRI, K). SOUTH KENNEDY DISTRICT: Cape River, *Bowman* (MEL); Port Mackay, *Dietrich* 2480 (MEL). LEICHHARDT DISTRICT: 9 miles [14 km] E of "Mantuan Downs", Apr 1946, *Everist* 2541 (BRI); Spring-sure, *sine coll.* (BRI, MEL); Gracemere, Mar 1871, *O'Shanesy* 1296 (MEL). WIDE BAY DISTRICT: Burnett Heads, *Michael* 1752 (BRI). MORETON DISTRICT: Islands of Moreton Bay, Aug 1855, *Mueller* (K, MEL). DARLING DOWNS DISTRICT: 12 miles [20 km] W of Westmar [27° 55'S 149° 35'E], Apr 1963, *Pedley* 1234 (BRI, K, MEL). **New South Wales:** Warialda, Jul 1905, [*Rupp?*] (MEL); Crow Mtn, Barraba, Jul 1913, *Rupp* (MEL); Narrabri, Jan 1883, *Betche* (MEL). **Papua:** CENTRAL DISTRICT: Bootless Bay near Port Moresby, Jun 1960. *Womersley & Thorne* NGF 12858.

4c. *P. corymbosa* var. *torrensis* Pedley, var. nov. a *P. corymbosa* var. *corymbosa* foliis internodia sequantibus vel eis longioribus et sepalis costis ± manifestis instructis dignoscenda. Sepals 2.5–3 mm longa; petala 0.7–1.1 mm longa. Capsula 1.4–2 mm longa pilis paucis longis basi vestitis. **Typus:** Badu I., *Bick* 83. (BRI, holo).

Distinguished from *P. corymbosa* var. *corymbosa* by the leaves as long as or longer than the internodes and sepals with ± distinct midnerves. Sepals 2.5–3 mm long; petals 0.7–1.1 mm long. Capsule 1.4–2 mm long with a few long hairs at the base.

Range: The northern part of Cape York Peninsula and islands of Torres Strait.

COOK DISTRICT: Albany I., Aug 1855, *Mueller* (K, MEL); Badu I., May 1911, *Bick* 83 (BRI); Thursday I., in 1878, *Chalmers* (MEL); Cape York, *Daemel* (K, MEL); Somerset, June 1897, *Bailey* (BRI).

Polycarphaea corymbosa, a pantropical species exhibiting a considerable range of variation, should properly be examined throughout its range if a satisfactory classification is to be arrived at. The following observations may assist other workers on the species.

On the whole, specimens from Australia resemble South American ones more closely than they do ones from Africa. Brennan and Taylor (Kew herb. records) noted that *P. brasiliensis* Comb. appeared to be different, but not specifically so from *P. corymbosa* from Asia and Africa, and that Chodat and Hassler had made the combination *P. corymbosa* var. *brasiliensis* for Paraguayan specimens. They considered the plant described as *P. nebulosa* by Lakela (1963) to be a slight variant of *P. brasiliensis*.

In view of the wide distribution and the complexity of the variation of the species I am reluctant to complicate the taxonomy of the species by describing two more infra-specific taxa, but within Australia both are sufficiently distinct to warrant at least varietal rank.

P. corymbosa var. *torrensis* is well defined in both foliar and capsular characters. The well defined rib of its sepals distinguishes it from the other varieties. Both Bentham (1863) and Bakker (1957) regarded the absence of a rib on the sepals as distinctive character of *P. corymbosa*, but accounts of the species vary from country to country and there are often inconsistencies between descriptions and illustrations. For example, Rohrbach (1872) stated that the midrib of *P. corymbosa* was hardly prominent ("vix prominente") but it is well enough defined in the plate. The plant drawn is remarkably similar in general appearance to *P. corymbosa* var. *torrensis*.

P. corymbosa var. *minor* is not as well defined as var. *torrensis*. I have applied the name to a variant found on sand in inland and coastal localities that varies more in general appearance than in any single character. It has somewhat smaller flowers and its sepals are tinged with red at the base. The taxon has been generally wrongly referred to as either *P. breviflora* or *P. corymbosa* var. *breviflora*. The misidentification is discussed under *P. breviflora* (p. 60).

5. Polycarpaea arida Pedley, sp. nov. affinis *P. corymbosae* (L.) Lam. inflorescentiis foliis floralibus longis \pm subtentis differt. **Typus:** *Everist* 3964 (BRI, holo; K, MEL, iso).

Herba perennis ad 10 cm alta; caules pubescentes pilis albis crispis vestiti; stipulae anguste ovatae integrae vel profunde laciniatae, foliis breviorae. Folia linearia 5–10 mm longa, mucronulata glabra, ea inflorescentiam condensam corymbosam subtentia inflorescentiam aequantia vel eam longiora. Bracteae sine costis sepala \pm aequantes; pedicelli pubescentes. Sepala 2.5–3.5 mm longa sine costis sed basibus crassis cartilagineis ca 0.3–0.5 mm longis; petala 0.6–1.1 mm longa obtusa integra; stamina petalis breviora filamentis 0.3 mm longis et antheris globulis 0.2 mm diam. Capsula 2 mm longa.

Perennial to 10 cm tall; stems pubescent with white crisped hairs; stipules narrowly ovate, entire or deeply laciniate, shorter than the leaves. Leaves linear 5–10 mm long, mucronulate glabrous, those subtending the condensed corymbose inflorescence as long as or longer than the inflorescence. Bracts without midribs, about as long as the sepals; pedicels pubescent. Sepals 2.5–3.5 mm long without midribs but with thick cartilaginous bases ca 0.3–0.5 mm long; petals 0.6–1.1 mm long, obtuse, entire; stamens shorter than the petals with filaments 0.3 mm long and globular anthers 0.3 mm in diameter. Capsule 2 mm long.

Range: Arid parts of northern Australia.

Western Australia: "Mt House", Apr 1955, *Lazarides* 5160 (BRI); Mt Squires, Barrow Ra., Aug 1891, *Helms* (MEL). **Northern Territory:** Glen of Palms, in 1872, *Giles* (MEL); James Range, in 1886, *Schwartz* (MEL); Finke River, in 1879, *Kempe* (MEL); Coglein River, near Charlotte Waters, May 1926, *Basedow* 9 (K). **South Australia:** Vicinity of Lake Eyre, *Andrews* comm. *Schomburgk* (K). **Queensland:** GREGORY NORTH DISTRICT: ca 100 miles [160 km] W of Windorah, Jun 1949, *Everist* 3964 (BRI, K, MEL); Thylungra, May 1963, *Macdonald* 432 (K). **WARREGO DISTRICT:** "Offham", 40 miles [64 km] W of Cunnamulla, Apr 1947, *Geary* (BRI). **New South Wales:** Mt Poole, near Wilcannia, in 1887, *Bauerlen* (MEL); Wankeroo Hills, 20 miles [32 km] N of Broken Hill, Jun 1928, *Morris* 2048 (BRI, K).

6. Polycarpaea diversifolia Domin, *Biblioth. Bot.* 89:102 (1925). t. 20 f. 8–15
Type: between Ashburton and Yule River, *Clement* (PR, holo; K, iso).

Annual with a pair of persistent orbicular basal leaves, ca 12 mm and 9 mm wide. Stems pubescent with crisped hairs. Upper leaves linear ca 2 mm long and 1 mm wide. Inflorescence rather loose; bracts ca 3.5 mm long. Sepals without midribs, 2.5–3 mm long; corolla 1.2–1.3 mm long with obscure folds inside at the base; staminal filaments 0.4 mm long. Capsule depressed globular, 0.4 mm long, 0.6 mm in diameter.

Range: North-western Australia.

Western Australia: between Ashburton and Yule Rivers, *Clement* (K, PR). **Northern Territory:** C.S.I.R.O. Research Station, Katherine, Apr 1964, *Adams* 952 (K).

I have seen only two collections of *P. diversifolia*. It appears to differ from *P. corymbosa* in being an annual and in having obscure folds inside the petals at the base, but the two may prove to be conspecific.

7. Polycarpaea involucrata F. Muell., Rep. Babb. Exped. 9 (1858). **Type:** Sturts Creek and Upper Victoria River, Mar 1856, *Mueller* (MEL, holo; K, iso?).

Similar to a species of *Alternanthera* in general appearance. Much branched; stems pubescent. Lower leaves rosulate, spatulate; upper \pm sessile, 5–9 mm long and 2 mm wide with crisped hairs on midribs below; stipules *ca* 3–4 mm long. Flowers \pm sessile in heads subtended by leaves *ca* 7 mm long; sepals 3.5–4.5 mm long, the outer ones thickened at the base; corolla 1.2 mm long, rather stout; staminal filaments 0.6 mm long. Capsule top-shaped with stout capitate stigma.

Range: Known only from type and one other locality in the Northern Territory.

Northern Territory: O.T. Station, 16°37'S 153°03'E, May 1947, *Blake* 17663 (BRI); Victoria River, May 1968, *Byrnes* NB 710 (BRI).

8. Polycarpaea holtzei Maiden & Betche in Ewart & Davies, Fl. North. Terr. 109 (1917). **Type:** Pine Creek, Feb 1914, Allen (K, iso).

P. pumilio Domin, Biblioth. Bot. 89:102 (1925). **Type:** between Ashburton and Yule River, *Clement* (PR, holo; K, iso).

Much branched; stems with hairs *ca* 0.4 mm long. Leaves appearing verticillate, linear, glabrous, with a fine point *ca* 1 mm long; stipules white lacinate almost as long as the leaves. Flowers in terminal cymes; bracts *ca* 3 mm long, fimbriate; pedicels *ca* 0.8 mm long, sparsely hairy; sepals glabrous, without ribs 1.7–2.8 mm long, fimbriate or deeply and rather irregularly bifid; petals brown, obtuse, 0.4–0.6 mm long; anthers longer than the filaments. Capsule 0.8 mm long obovoid, 3-valved, 1-seeded.

Range: Along north-western coast of Western Australia through the Kimberley region to the north-western part of the Northern Territory.

Western Australia: Harding River, in 1895, *Cusack* 101 (MEL); between Gasgoyne & Fortescue Rivers, in 1885, *King* (MEL); Nickol Bay, in 1876, *Crouch* (MEL); near "Mt House", Apr 1955, *Lazarides* 5160 (K, MEL). **Northern Territory:** Port Darwin, in 1890, *Holtze* 1011 (MEL); Darwin, Nov 1929, *Bleeser* 179 (MEL); [18 km] S of Batchelor, Mar 1961, *Chippendale* NT 7729 (K); Edith River, Jan 1965, *Wilson* 246 (K).

The flowers of the type of *P. holtzei* are smaller than those of the type of *P. pumilio*, but there is little doubt that the two are conspecific. *P. holtzei* is unusual in *Polycarpaea* in having a 1-seeded capsule. It could well constitute a distinct section.

9. Polycarpaea microphylla Pedley, sp. nov.; a specibus Australiae bene distincta, antem facie et habitu *P. hassleranae* Chod. ex America australi similis.
Typus: *Brass* 415 (BRI, holo).

Herba ramosissima perennis usque ad 15 cm alta caulibus hirsutis foliis in verticillum 3-foliatum dispositis. Folia acicularia 1.5–2 mm longa internodia aequantia; stipulae folia aequantes. Flores singulatim vel in fasciculis paucifloris in extremitatibus ramulorum dispositi;

bracteae ovatae integrae acuminatae vel profunde bifidae fimbriatae vel margine minute serrato, 1–2 mm longae; sepals lanceolata vel ovata acuminata 2.5 mm longa interdum subtiliter pubescentia, petala lanceolata obtusa 1.5–2 mm longa; filamenta staminea 0.5–1 mm long, antherae elongatae sagittatae ca 0.5 mm longae; ovarium glabrum sessile 3-valvatum ca 1 mm longum, stylus tenuis 0.6–1 mm longus.

Branched perennial herb to 15 cm high with hirsute stems. Leaves acicular 1.5–2 mm long in whorls of three, as long as the internodes; stipules as long as the leaves. Flowers single or in few-flowered fascicles at the end of the branches; bracts ovate entire acuminate or deeply bifid, fimbriate or minutely serrate on the margins, 1–2 mm long; sepals lanceolate or ovate acuminate 2.5 mm long sometimes finely pubescent; petals narrow lanceolate, obtuse, 1.5–2 mm long; staminal filaments 0.5–1 mm long, anthers elongate, sagittate ca 0.5 mm long; ovary glabrous, sessile, 3-valved, ca 1 mm long, style slender 0.6–1 mm long.

Range: Sporadically distributed from Katherine in the Northern Territory to the extreme north-west of Queensland.

Northern Territory: Katherine Gorge, May 1968, *Byrnes* NB 679 (DNA); Robinson River, Jul 1925, *Brass* 415 (BRI). **Queensland:** BURKE DISTRICT: N of "Riversleigh", Jun 1963, *Gittins* 807 (BRI).

Polycarpha microphylla is remarkably similar in general appearance to *P. hasslerana* Chod. which is confined to south-western Brazil (Matto Grosso) and Paraguay. It has larger flowers and shorter leaves however. It is possible that both species have evolved from *P. corymbosa*.

10. *Polycarpha longiflora* F. Muell., Rep. Babbage Exped. 8 (1858). Syntypes: two specimens—Victoria River, May 1856, *Mueller* (MEL; K, iso?).

P. longiflora var. *leucantha* Benth., Fl. Aust. 1:165 (1863). **Type:** Victoria River, *Mueller* (K, holo; MEL, iso).

Reesia erecta Ewart, Proc. Roy. Soc. Victoria 26 (n.s.): 9 (1913); Willis, Vict. Nat. 61:175 (1945). **Type:** near Pine Creek, Aug 1904, *Niemann* (MEL, holo).

Erect perennial rather woody at the base, stems pubescent. Leaves subglabrous to pubescent, shorter than the internodes. Bracts acuminate 6–7 mm long, fimbriate in the lower part. Pedicels 2–5 mm long, pubescent. Sepals oblong acute fimbriate in the lower part, with a definite midrib, (5–)6–8(–9) mm long ca 2 mm wide; petals united at base into a tube.

Range: The north-western part of Western Australia and the northern part of the Northern Territory.

Western Australia: Barrow I., Nov 1953, *Hill* 430 (K); between Ashburton & Yule R., *Clement* (K); Nickol Bay, in 1874, *Crouch* (MEL); Dampier Arch., in 1875, *Walcott* (MEL); Yule River, in 1878, *Forrest* (MEL); Roebuck Bay, in 1889, *Tepper* (MEL); Greville I., Aug 149/1821, *Cunningham* (K); Cambridge Gulf, in 1886, *Ranford & Nynlasy* (MEL). **Northern Territory:** 40 miles [64 km] W of Wavehill Police Station, Jun 1949, *Perry* 2272 (BRI, MEL). Port Darwin, in 1879, *Forrest* (MEL); 57 miles [91 km] SE of Adelaide River, Mar 1963, *Lazarides* 6842 (K); 9 miles [14 km] S of Batchelor, Mar 1961, *Chippendale* NT 7745 (K); 66 miles [105 km] NE of "Creswell", Jul 1948, *Perry* 1664 (BRI, K); Settlement Creek, Apr 1922, *Brass* 147 (BRI). **Queensland:** BURKE DISTRICT: near mouth of Settlement Creek, Jun 1948, *Perry* 1242 (BRI, K).

There is an intergrade from plants with white sepals through those tinged with pink to plants with violet sepals. The width of leaves of no taxonomic significance so that recognition of *P. longiflora* var. *leucantha* is not justified. Willis has discussed the identity of *Reesia erecta*.

11. *P. spirostylis* F. Muell., Rep. Babb. Exped. 8 (1858).

Erect herb up to 40 cm high branched at the base, glabrous except for a few hairs sometimes in the axils of the leaves and bracts. Leaves linear mucronulate 1–3 cm long. Inflorescence terminal, corymbose, open or compact; bracts narrowly ovate to ovate, sometimes amplexicaule, sometimes ciliolate or lacinate towards the top; pedicels up to 2 mm long. Sepals with brownish, reddish or purplish midribs 4.5–13 mm long, narrowly ovate; corolla 3.4–10 mm long, occasionally as long as the sepals, the tube 2.5–6 mm long the lobes sometimes deeply bifid; staminal filaments shorter than to longer than the corolla.

11a. *P. spirostylis* subsp. *spirostylis*.

Type: Tropical Australia, *Mueller* (MEL, holo; K, iso)

P. burtonii F. M. Bailey, Proc. Roy. Soc. Qd 1:85 (1884). **Syntypes:** Walsh Range, between Tate River & Thornborough, *Burton* 3 (BRI; MEL, iso); Herberton, *Stuart* (BRI)

P. spirostylis var. *burtonii* (F. M. Bailey) Domin, Biblioth. Bot. 89:99 (1925). Based on *P. burtonii*.

P. spirostylis var. *rosulans* Domin, *op. cit.* 100 (1925). **Type:** Locis subrudis in xerodrymio apud opp. Chillagoe, Feb 1910, *Domin* (PR, holo).

P. spirostylis var. *intercedens* Domin, *op. cit.* 100 (1925). **Type:** Apud fl. Walsh R., prope opp. Chillagoe, Feb 1910, *Domin* (PR)

Inflorescence open with pedicels 0.8–2 mm long. Sepals with purplish midribs, 7–13 mm long; petals shortly bifid 7–10 mm long united into a tube 4–6 mm long; staminal filaments shorter than the corolla.

Range: South-eastern Cape York Peninsula, headwaters of Gilbert, Flinders and Burdekin Rivers south to about 20°S.

BURKE DISTRICT: "Mt Sturgeon", N of Hughenden, Feb 1931, *Hubbard & Winders* 7572 (BRI, K). COOK DISTRICT: Gilbert River, Mar 1925, *Brass* 448 (BRI); Einasleigh River, *Armit* 1072 (MEL); Mt Molloy, Apr 1932, *Brass* 2450 (BRI); Hodgkinson River, in 1882, *Gulliver* (MEL); ca 20 miles [32 km] SE of Chillagoe, Jun 1970, *Leroy* (BRI); Granite Creek, ca 8 miles [13 km] W of Mareeba, Apr 1967, *Pedley* 2247 (BRI); Stannary Hills, Jun 1962, *Gittins* 537 (BRI). NORTH KENNEDY DISTRICT: Millstream Falls, Ravenshoe, Jun 1913, *Bick* (BRI); Rockingham Bay, Jun 1866, *Dallachy* (MEL); 100 miles swamp, Herbert River, Mar 1875, *Armit* 123 (MEL). SOUTH KENNEDY DISTRICT: Collinsville, 147°51'E, 20°34'S, Oct 1969, *Zimmerman* (BRI).

P. spirostylis subsp. *spirostylis* sometimes grows on soils containing high concentrations of copper and zinc and has been used as an indicator of copper deposits. It often grows on country without any sign of mineralization.

P. spirostylis var. *rosulans* and *P. spirostylis* var. *intercedens* were based on rather young plants of *P. spirostylis* subsp. *spirostylis*.

11b. *P. spirostylis* subsp. *glabra* (White & Francis) Pedley, stat. nov. Based on *P. glabra* White & Francis, Proc. Roy. Soc. Qd 37:152 (1926). **Type:** Mt Isa, Dugald Silver Lode, Apr 1924, *Miller* (BRI, holo).

P. synandra F. Muell., Rep. Babb. Exped. 8 (1858). **Type:** not seen—see below.

P. spirostylis var. *intricata* Domin, Bibl. Bot. 89:100 (1923). **Type:** Burketown, *Ball* (PR, holo).

Inflorescence open with pedicels more than 0.8 mm long. Sepals with red-brown midribs 6–7 mm long; corolla (4–)5–6 mm long united into a tube 2.5–3.2 mm long, the lobes bifid (1 mm or more); staminal filaments longer than the corolla.

Range: The extreme north-western part of Western Australia, the Northern Territory, western Queensland and northern South Australia.

Western Australia: 17°17'S 123°05'E, in 1879, *Carey* (MEL); near the Ord River, in 1886, *O'Donnell* (MEL). **Northern Territory:** Victoria River, *Mueller* (MEL); Plum Tree Creek, S. Alligator River, Feb 1969, *Byrnes* 1371 (BRI, DNA); Settlement Creek, Apr 1922, *Brass* 148 (BRI); near Central Mt. Stuart, Jun 1924, *Ewart* (MEL); Ingallana Creek, 21 miles [34 km] NW of "Anningie" (ca 21°35'S 133°E), Jul 1958, *Chippendale* NT 4713 (BRI, MEL). **Queensland:** BURKE DISTRICT: Lawn Hill, May 1940, *Jensen* 68 (BRI); Mt Isa, Feb 1931, *Winders* in *Hubbard* 7397 (BRI, K); 20 miles [32 km] W of Cloncurry, 20° 42'S 140°12'E, Apr 1971, *Beaumont* 7055 (BRI). MITCHELL DISTRICT: near the Alice River, *Birch* (MEL). GREGORY SOUTH DISTRICT: Near Eyre Creek, in 1877, *Kayser* (MEL). **South Australia:** Wonamulla [Woolnomulla Bluff, 136°14'S 30°10'E], *Mueller* (MEL).

P. spirostylis subsp. *glabra* has smaller flowers than *P. spirostylis* subsp. *spirostylis* with deeply bifid lobes and staminal filaments longer than the corolla. There are intermediates where the ranges of the two meet and subspecific rank is appropriate. Bakker (1957) observed under *P. spirostylis* that *Hubbard* 7397 "differs in having bifid petals and filaments slightly longer than the petals".

White and Francis noted in the protologue to *P. glabra* that it grew on silver-lead lodes. Cole (1965) has demonstrated the plant's ability to grow in such situations is due to its low uptake of minerals on heavily mineralized soils.

I have taken *P. glabra* as the basionym because the plant has been generally referred to in geobotanical literature as *P. glabra* and because there are some difficulties in the typification of the earlier *P. synandra*. The type of *P. synandra* has not been located. The type locality was given by Mueller as Wirrawirraloo, which is the name of a creek near Woomera, South Australia. No specimen with this locality was found at either Kew or Melbourne. At MEL there is a sheet (MEL 49121) on which are mounted two whole plants and three fragments. All represent one species. The sheet bears a label (initialled by Bentham) written by Mueller—"Polycarpaea synandra ferd. Mueller/Victoria River. ferd Mueller". The fragments are in two packets attached to the sheet. On one is written "Polycarpaea synandra Victoria River"; on the other "Polycarpaea synandra Wonamulla". The last locality is, from the coordinates given in the introduction to the Report of Babbage's Expedition, the same as or close to Woolnomulla Bluff which is about 150 km north-west of the type locality given by Mueller.

In the absence of a specimen from the type locality the fragments in the packet marked Wonamulla are taken as representative of *P. synandra*. They were collected by Mueller close to the type locality and were seen by Bentham.

11c. *P. spirostylis* subsp. *densiflora* (Benth.) Pedley, comb. et. stat. nov. Based on *P. synandra* var. (?) *densiflora*, Benth., Fl. Aust. 1:165 (1863).

Lectotype: Cape Flinders, Jul $\frac{131}{1819}$, *Cunningham* (K)

P. gamopetala Berhaut, Bull. Mus. Nat. Hist. Natur. 25 (ser. 2): 212 (1953). **Type:** Senegal. Ex herb. DC., Herb. *Moquin-Tandon* (P, holo).

Inflorescence compact with pedicels less than 0.8 mm long. Sepals with purplish midribs, 6–7 mm long; corolla 4.5–5.5 mm long united into a tube 3–4 mm long, the lobes entire or slightly bilobed; staminal filaments about as long as the corolla.

Range: Arnhem Land (?) and Cape York Peninsula.

Northern Territory, 4 miles [6 km] NE of "Mountain Valley", Apr 1962, *Nelson* 188 (BRI, DNA, MEL). **Queensland:** COOK DISTRICT: Mapoon, May 1911, *Bick* 109 (BRI); Musgrave Tele. Office, Mar 1893, *Jacobsen* (BRI); Kennedy road, 44 miles [70 km] beyond (N of) Laura, Jul 1965, *Gittins* 975 (BRI, MEL)

P. spirostylis subsp. *densiflora* and *P. spirostylis* subsp. *spirostylis* differ in the slightly smaller flowers and more compact inflorescences of the latter. The ranges of the two are distinct. I have some doubt about the identity of some specimens from the Northern Territory, but they belong here rather than with other subspecies.

There are two syntypes of *P. synandra* var. *densiflora* at Kew and possibly another at Melbourne. One at Kew has been chosen as lectotype: the others from Port Denison and Rockhampton are referred to *P. spirostylis* subsp. *compacta*.

Berhaut expressed doubt that *P. gamopetala* was native to Africa. He recognised that it belonged to section *Planchonia* but was unable to place it and therefore described it as new. Berhaut's doubts were justified. The specimen at Paris should be referred to *P. spirostylis* var. *densiflora*.

11d. *P. spirostylis* subsp. *compacta* Pedley, subsp. nov. Inflorescentia compacta pedicellis minus quam 0.8 mm longis instructa. Sepals 4.5–5 mm longa costis porphyreis ornata; corolla 3.5–4 mm longa lobis non profunde incisuratis instructa, in tubum conjunctis; filamenta staminea corolla breviora. **Typus:** *Speck* 4720 (BRI, holo; K, MEL, iso).

Inflorescence compact with pedicels less than 0.8 mm long. Sepals 4.5–5 mm long usually with reddish-brown midribs; corolla 3.5–4 mm long with lobes not deeply notched united in a tube ca 2.5 mm long; staminal filaments shorter than the corolla.

Range: South-eastern Gulf of Carpentaria to central Queensland.

BURKE DISTRICT: 16 miles [26 km] W of Croydon, Jul 1960, *Trapnell* 206 (BRI). **COOK DISTRICT:** Cumberland, Gilbert River [18°15'S 143°30'E], May 1937, *Brass* 8830 (BRI). **NORTH KENNEDY DISTRICT:** Port Denison, *Fitzalan* (K, MEL, syntype of *P. synandra* var. *densiflora*). **MITCHELL DISTRICT:** near the Alice River, in 1884, *Birch* (MEL). **SOUTH KENNEDY DISTRICT:** "Cerito" [21°13'S 147°45'E], May 1964, *Adams* 970 (BRI, CANB). **PORT CURTIS DISTRICT:** Rockhampton, [*Thozet*] (MEL). **LEICHHARDT DISTRICT:** Lake Elphinstone, *Dietrich* (MEL)

P. spirostylis subsp. *compacta* resembles *P. spirostylis* subsp. *densiflora* (and *P. breviflora* var. *gracilis*) in having compact heads but differs from the other subspecies in having smaller flowers.

12. *P. breviflora* F. Muell., Rep. Babb. Exped. 9 (1858).

Perennial herb glabrous except for a few long hairs in axils of leaves and bracts. Bracts acute or acuminate sometimes lacinate in lower half, 2–3 mm long. Sepals white with prominent midrib, (2.5–)3–4 mm long, white with white or purplish midribs; corolla (1.2–)1.5–2.6 mm long with a tube 0.5–1.0 mm long and bifid lobes. Stamens almost as long as the corolla.

12a. *P. breviflora* var. *breviflora*.

Type: Gulf of Carpentaria, *Mueller* (MEL, holo; K, iso).

P. corymbosa var. *breviflora* (F. Muell.) Domin, *Biblioth. Bot.* 89:10 (1925), based on *P. breviflora*.

P. brevianthera Ewart & Davies, *Fl. North. Terr.* 109 (1917). **Type:** Roper River, in 1911, *Baldwin Spencer* (MEL, holo).

P. triloba Ewart & Cookson in Ewart & Davies, *op. cit.* 109 (1917). **Type:** Georgina River, 1888, *Henry* (MEL, holo).

P. parviflora, Domin, *Biblioth. Bot.* 89:100 (1925). **Type:** *Locis subnudis* in xerodrymio apud opp. Cloncurry, Feb 1910, *Domin* (PR, holo).

Inflorescence spreading; sepals white, ovate.

Range: North-eastern part of Arnhem Land, north-western to central inland Queensland.

Northern Territory: Katherine Gorge, Mar 1971, *Dunlop & Byrnes* 2162 (DNA); 7 miles [11 km] NW of "Alexandria", Mar 1956, *Chippendale* NT 1945 (BRI, MEL); Manners Creek", May 1955, *Chippendale* NT 1141 (BRI, MEL); 25 miles [40 km] NE of "Tarlton Downs", May 1955, *Lazarides* 5239 (BRI, MEL). **Queensland:** BURKE DISTRICT: 14 miles [22 km] N of Turn-off Lagoon, Jun 1966, *Pedley* 2076 (BRI); Doomadgee Mission, *Whitehouse* (BRI); Mt Isa, Feb 1931, *Winders* in *Hubbard* 7417 (BRI, K); Cloncurry, in 1883, *Palmer* 77 (MEL). GREGORY NORTH DISTRICT: "Oban", ca 62 miles [100 km] SE of Mt Isa, Dec 1947, *Everist* 3349 (BRI); Diamantina Lakes, Oct 1941, *Walker* (BRI). MITCHELL DISTRICT: Prairie, Feb 1931, *Hubbard* 7074 (BRI, K); near Blackall, Feb 1938, *Everist* 1588 (BRI).

12b. *P. breviflora* var. *gracilis* (Benth.) Pedley, comb. nov. Based on *P. synandra* var. *gracilis* Benth., *Fl. Aust.* 1:165 (1863) **Lectotype:** Port Essington, Apr $\frac{268}{1818}$, *Cunningham* (K; MEL, iso).

Inflorescence rather compact; sepals narrowly ovate, white with distinct purplish midrib.

Range: Coastal parts of Arnhem Land.

Northern Territory: Arnhem's Land, *Brown* (MEL); Croker I., Mar 1883, *Foelsche* 69 (MEL); Melville Bay, 12°11'S 136°35'E, Aug 1948, *Specht* 917 (BRI, MEL); Port Bradshaw, 12°27'S 136°42'E, Jul 1948, *Specht* 729 (BRI, MEL); South Bay, Bickerton I., 13°45'S 136°06'E, Jun 1948, *Specht* 581 (BRI, MEL).

In general appearance *P. breviflora* var. *gracilis* resembles *P. spirostylis* subsp. *densiflora* but its flowers are distinctly smaller. Its narrower sepals with prominent purplish midribs and more compact inflorescences distinguish it from *P. breviflora* var. *breviflora*.

P. breviflora is distinguished from other species of section *Planchonia* in having small flowers. It resembles *P. corymbosa* and its allies (section *Polycarpaea*) but the corolla is united into a short but definite tube. Flowers of *P. breviflora* sometimes have only rudimentary anthers and are functionally female. The flowers may also be heterostylous. As can be seen from the figures with the original descriptions, one of the differences between *P. brevianthera* and *P. triloba* is the somewhat smaller anthers of *P. triloba*. This difference is of no taxonomic significance.

The type specimen of *P. breviflora* is extremely poor and it is not surprising that the name has been misapplied. In the protologue Mueller noted that "A plant closely allied to this species and possibly only a variety of it occurs on Moreton Island". Bentham (1863) referred Mueller's specimen ("Islands of Moreton Bay") to *P. breviflora* without comment, and, because of the scrappiness of the type material, since then the name *P. breviflora* has been incorrectly applied to the taxon represented by this specimen. Domin in making the combination *P. corymbosa* var. *breviflora* recognised the position of Mueller's Moreton Bay specimen, but his combination must apply to *P. breviflora* sens. strict. not to the Moreton Bay plant which is referred to *P. corymbosa* var. *minor*.

Because the name *P. breviflora* has been misapplied for a long time, certainly for the last fifty years, some authors (for example, Burt 1973) would reject it under Article 69 of the International Code of Botanical Nomenclature as being a long persistent source of error. If this were done either the name *P. brevianthera* or *P. triloba* would have to be applied to the species. The taxonomy and nomenclature of almost all Australian species of *Polycarpaea* have been in confused state for so long however, that the misapplication of one name is of little significance among a large number of misidentifications. I have therefore retained the name *P. breviflora* for the species to which it was applied by Mueller.

Excluded species

P. spicata Arn.

There is one specimen at Kew labelled "N.W. Coast, *Bynoe*". I have seen no other material from Australia and until further specimens are collected I regard the record as a doubtful one. The species occurs in N.E. Africa and India but is absent from Malasia.

References

- BAKKER, K. (1957). Revision of the genus *Polycarpaea* in Malaysia. *Act. Bot. Neerland.* 6:48-53.
- BENTHAM, G. (1863). *Polycarpaea* in *Flora Australiensis* 1:163-167.
- BURT, B. L. (1973). *Polygala* arvensis, chinensis and glomerata. *Notes Roy. Bot. Gard. Edinburgh* 32:403-404.
- COLE, MONICA M. (1965). The use of vegetation in mineral exploration in Australia. *Eighth Commonwealth Min. Metall. Cong. Proc.* 6. Paper 13:1429-1458.
- LAKELA, OLGA (1963). Annotation of North American *Polycarpaea*. *Rhodora* 65:35-44.
- ROHRBACH, P. (1872). *Polycarpaea* in *Flora Brasiliensis* 14(2):254-255.
- WHITE, C. T. & W. D. FRANCIS (1926). Contribution to the Queensland Flora, No. 3. *Proc. Roy. Soc. Qd* 37:152-166.